

USPTO SN: 10/042,511
Bischoff et al.
Reply to Office Action mailed March 9, 2004

REMARKS

The specification has been amended to correct typographical errors. Reference number 744 has been changed to 794 in the amended paragraphs. No new matter is believed to be entered by the amendment to the specification.

The Office Action rejects claims 1, 2, 5, 6, 9, 11-26, 32-42, and 48-62 under 35 U.S.C. 103 as being unpatentable over Allington in view of Silveri.

Applicant(s) have cancelled claim 1-2. Applicant(s) have claim 3 as per the Examiner's helpful suggestion to include the limitation of the base claim. Claims 3-15 are believed to be in condition for allowance.

Applicant(s) have cancelled claim 16.

Claim 17, as amended, recites an adapter for coupling a sensor (e.g. 106) to a fluid system comprising a fluid line including a fluid input port (e.g. 108), a fluid output port (e.g. 110), and a flow bore (e.g. 112) extending from the fluid input port to the fluid output port. The fluid line further including a first opening (e.g. 116) extending from the flow bore to a surface of the fluid line. An isolator block (e.g. 104) has a first cavity (e.g. 124) and has a second cavity (e.g. 126) formed in a surface of the isolator block. The surface of the isolator block is coupled to the surface of the fluid line between the fluid input port and fluid output port such that the second cavity is in fluid communication with the first opening in the fluid line. A first flexible membrane (e.g. 128) is formed in the isolator block and physically separates the first cavity from the second cavity. The first flexible membrane transfers a pressure between the first cavity and the second cavity.

USPTO SN: 10/042,511

Bischoff et al.

Reply to Office Action mailed March 9, 2004

The Office Action refers generally to FIGs. 2, 7, and 18 and associated text. The Allington reference discloses a piston pump for pumping liquid carbon dioxide. The volume leaving the pump is determined by measuring pressure, or other parameter related to flow and movement of the plunger. The position of the piston is measured and the resulting displacement is integrated to determine volume of fluid pumped. FIG. 2 illustrates a breech plug pressure vessel. FIG. 7 illustrates a cross-sectional view of a pumphead, drive cam, and thermoelectric cooling means. As discussed on column 21, lines 49-59, of the Allington reference, fluid volume is measured by pressure and movement of the piston 304 within the chamber 336 of FIG. 7. FIG. 18 illustrates a valve assembly.

In a telephone conference call with the Examiner on or about April 27, 2004, the Examiner confirmed that, for example, with respect to Allington's FIG. 2, the Office Action reads fluid fitting 46 as the Applicant's fluid line and surface 142 of pressure vessel 24 as Applicant's isolator block. The Examiner also confirmed that, with respect to Silveri's FIGs. 8A and 9B, the Office Action reads plug 226 as Applicant(s)' first membrane.

With respect to amended claim 17, the Allington reference fails to disclose a fluid line having a fluid input port, a fluid output port, and a flow bore extending from the fluid input port to the fluid output port. Allington does not have a first opening extending from the flow bore to a surface of the fluid line. None of the FIGs. 2, 7, or 18 in Allington discloses any such fluid line with three distinct openings, i.e. fluid input port, fluid output port, and first opening, as claimed. The fluid line 46 in Allington's FIG. 2, and fluid lines 308 and 310 in FIG. 7, and likewise in FIG. 18, each

USPTO SN: 10/042,511

Bischoff et al.

Reply to Office Action mailed March 9, 2004

terminate at the pressure vessel, and therefore do not have the claimed first opening. In contrast, Applicant(s) claim a fluid line in which fluid flows along the flow bore, from the fluid input port to the fluid output port. The physical state of the fluid, e.g. its pressure, is monitored by way of the first opening in the fluid line located along the flow bore between the fluid input port and the fluid output port. Allington discloses no such feature.

Moreover, Applicant(s) believe that Allington does not teach or suggest an isolator block having a first cavity and having a second cavity formed in a surface of the isolator block. The wall 142 of pressure vessel 24 in the Allington reference does not have a surface that is coupled to the surface of the fluid line such that the second cavity is in fluid communication with the first opening in the fluid line. Again, Allington does not disclose an isolator block coupled to and in fluid communication with the fluid line, as recited in the amended claim.

Applicant(s) agree with the statement in the Office Action that Allington does not disclose the first diaphragm/membrane. To support the obviousness rejection of claim 17, the Office Action relies on the Silveri reference. Silveri discloses plug 226 which closes the large opening in the end plug 234 to prevent an ingress of water into the electrolytic solution within the tubular body 248 of the probe 6. The plug 226 is made of a porous material, such as, for example, a porous glass or porous TEFLON, or wood, and functions as a membrane allowing the passage of electrons. However, the plug in Silveri is not disclosed as having a flexibility property and certainly is not disposed between first and second cavities. Plug 226 is disclosed as a solid porous material designed for passage of

USPTO SN: 10/042,511

Bischoff et al.

Reply to Office Action mailed March 9, 2004

electrons. Plug 226 is positioned at the inlet of end plug 234. Silveri does not teach or suggest a flexible membrane which transfers a pressure between the first cavity and the second cavity.

Claim 17 is believed to patentably distinguish over the Allington and Silveri references, taken singularly or in combination. Claims 19-21, 23-25, and 27-30 are believed to be in condition for allowance as each is dependent from an allowable base claim.

Applicant(s) have cancelled claims 18, 22, 26, and 31.

Claim 32, as amended, recites an adapter for coupling a sensor to a fluid system comprising a fluid line including a fluid input port, a fluid output port, and a flow bore extending from the fluid input port to the fluid output port. The fluid line further including a first opening extending from the flow bore to a surface of the fluid line. An isolator block has a first cavity and has a second cavity formed in a surface of the isolator block. The surface of the isolator block is coupled to the surface of the fluid line such that the second cavity is in fluid communication with the first opening in the fluid line. A first membrane is formed in the isolator block and physically separates the first cavity from the second cavity. The first membrane transfers a pressure between the first cavity and the second cavity. A first spacer element has one or more openings extending therethrough from a first surface to a second surface. The first spacer element is coupled within the first cavity such that one of its first and second surfaces is positioned proximate the first membrane. A sensor is in fluid communication with one of the openings in the first spacer element.

USPTO SN: 10/042,511

Bischoff et al.

Reply to Office Action mailed March 9, 2004

With respect to amended claim 32, the Allington reference does not teach or suggest Applicant(s) claimed fluid line for the same reason given in the discussion of claim 17. Likewise, Allington does not disclose Applicant(s) isolator block for the same reason given in the discussion of claim 17. The plug 226 shown in the Silveri reference is not a first membrane which is formed in the isolator block and does not physically separate the first cavity from the second cavity. Silveri's plug does not transfer a pressure between the first cavity and second cavity.

Claim 32 is believed to patentably distinguish over the Allington and Silveri references, taken singularly or in combination. Claims 33-36 and 38-46 are believed to be in condition for allowance as each is dependent from an allowable base claim.

Applicant(s) acknowledge the allowance of claim 47.

Applicant(s) have cancelled claims 37 and 48-63.

Applicant(s) acknowledge the allowance of claim 64. Claim 64 is amended to correct a typographical error.

Applicant(s) have added new claims 65-70. New claim 65 recites an apparatus for sensing a physical state of fluid which flows from a first point to a second point along a fluid line. An isolator block has a first cavity formed in a surface of the isolator block. The surface of the isolator block is coupled to a surface of the fluid line such that the first cavity is disposed over a first opening which is located on the surface of the fluid line between the first and second points of the fluid line. A first membrane is formed in the first cavity of the isolator block. A pressure from the fluid line is transferred across the first membrane. A sensor has a first inlet coupled to a first outlet of the isolator block which is connected by a

USPTO SN: 10/042,511

Bischoff et al.

Reply to Office Action mailed March 9, 2004

first channel to a surface of the first membrane opposite from the fluid line.

The Allington and Silveri prior art references do not disclose an isolator block having a first cavity formed in a surface of the isolator block, wherein the surface of the isolator block is coupled to a surface of the fluid line such that the first cavity is disposed over a first opening in the fluid line which is located on the surface of the fluid line between the first and second points of the fluid line. Neither Allington nor Silveri show a first membrane formed in the first cavity of the isolator block such that a pressure from the fluid line is transferred across the first membrane. Neither of the prior art references mention that a sensor has a first inlet coupled to a first outlet of the isolator block which is connected by a first channel to a surface of the first membrane opposite from the fluid line.

New claims 65-70 are believed to patentably distinguish over the Allington and Silveri references.

Applicant(s) have made an earnest attempt to place this application in condition for allowance. In light of the remarks and/or amendments set forth above, Applicant(s) respectfully request reconsideration and allowance of the pending claims. If there are matters that can be discussed by telephone to further the prosecution of the Application, Applicant(s) invite the Examiner to call the undersigned attorney at the Examiner's convenience.

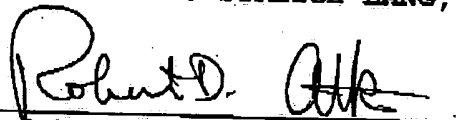
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The Commissioner is authorized to charge any fees due in connection with this filing and during the pendency of this application to Deposit Account No. 17-0055.

Respectfully submitted,

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